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**Session SC25 - Tunneling in High T<sub>c</sub> Superconductors II.**

*ORAL session, Wednesday afternoon, March 24*

*Room 171W, GWCC*

**[SC25.01] Quasiparticle tunneling spectroscopy study of high-temperature superconductivity under a spin-polarized current in cuprate/manganite heterostructures**

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Scanning tunneling spectroscopy was performed at 4.2K on epitaxial thin-film heterostructures comprising YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7- $\delta$</sub>  and La<sub>0.7</sub>A<sub>0.3</sub>MnO<sub>3</sub> (A=Ca,Sr), to study the microscopic effects of spin-polarized quasiparticle injection from the half-metallic ferromagnetic manganite on the high-T<sub>c</sub> cuprate superconductor. Sample temperature was monitored by in-situ thermometry to rule out Joule heating effects. Heterostructures with non-magnetic LaNiO<sub>3</sub> underlayers were also measured as a control without spin-polarization. Quasiparticle tunneling characteristics observed on the cuprate/manganite samples were consistent with d-wave pairing symmetry, which appeared to be invariant under the spin-polarized current up to  $1.2 \times 10^4$  A/cm<sup>2</sup>,  $\sim 25\%$  the critical current. The spectral evolution with current showed evidence of pair-enhancement at low injection and pair-suppression at high injection, as well as quasidelectron/quasihole branch-imbalance! ! These phenomena suggest a scenario of dynamic Cooper-pair breaking associated with a non-equilibrium distribution of spin-polarized quasiparticles.

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